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A NEW GENUS OF MINUTE FUNGUS-PORE BEETLES FROM OREGON
(Coleoptera: Ptiliidae)

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The feather-wing beetles that inhabit the spore tubes of polypore fungi are remarkably interesting because of their small size and extreme restriction to a specialized ecological niche. The basic and most recent publication on the group is the readable and stimulating paper of the late H. S. Barber (1924), entitled *New Ptiliidae related to the smallest known beetle*. In that paper, Barber assembled records and materials on the "smallest known beetles" and showed that these pertained to a natural group that is specialized for existence in the spore tubes of shelf or bracket fungi of the family Polyporaceae, and that both adults and larvae feed on growing spores. Barber recognized four genera and eight species in a new subfamily, Nanosellinae, with a distribution from the eastern United States to southern Brazil. None were recorded from west of the Mississippi River in the United States.

Through the courtesy of Dr. Melville H. Hatch of the University of Washington, I have been able to study several lots of a distinctive new genus of Nanosellinae collected in Oregon in 1951 by Borys Malkin. In two of the lots, the host fungus had been preserved and has been identified as *Fomes pinicola* (Fr.) Cke. by Dr. John A. Stevenson. The new genus, described below, is related to *Mycophagus* and *Cylindrosella* but is clearly more generalized.

POROPHILA gen. nov. Figures 95–97.

Type species.—Porophila malkini sp. nov.

A genus of Nanosellinae closest to *Mycophagus* (sensu Barber, 1924) but differing in the following characters: (1) The form of the mesopleural-metasternal suture, which is directed laterally for

a distance before bending anteriorly (fig. 95, *b*); in *Mycophagus* (cf. *atrocephalus* Dury) the suture curves anteriorly from the mesocoxa. (2) The mesosternal carina, whose posterior apex meets the metasternum between the mesocoxae without an apparent suture; in *Mycophagus* the apex of the mesosternal carina overlaps the metasternum as a thin lamina (visible only in cleared microscope slide preparations). (3) The 11-segmented antennae, in which segments 3–5 are subequal in length; in *Mycophagus* the antennae are apparently 10-segmented (the terminal segment has a partly differentiated distal portion that Barber [1924] erroneously interpreted as a reduced eleventh segment) and the apparent segment 3 is about two or more times as long as segments 4 or 5. (4) The pygidial spine, which has the form of a lobe with a strong tooth on each side; in *Mycophagus* the pygidial spine is acute or emarginate at middle.

Elongate-oval in form (fig. 95, *a*). Head moderate in size, inserted into the pronotum to the eyes and partly covered by the rounded anterior part of the pronotum. Eyes large and prominent. Antennae (fig. 96, *a*) short; 11-segmented; segments 1–2 large, 3–6 small, subequal, 7–9 becoming larger, 10 large, as broad as long, 11 large and elongate; segments 9–11 each with a median whorl of about 6 strong, curved setae; 10 and 11 with an additional basal whorl of about 14 setae and with clumps of pale, vesicular setae beyond the middle (indicated by dotted lines in fig. 96, *a*); segment 9 with a few basal setae. Gula lacking, as in all Ptiliidae; posterior arms of tentorium of head attached to posterior ventral margin of head capsule and connected by a transverse bar that is sinuate anteriorly at middle.

Pronotum about two-thirds as long as broad, its anterior margin rounded; broadest at base, sides evenly curved, posterior angles not produced, partly covering base of elytra and scutellum.

Scutellum triangular (fig. 95, *a*), more or less covered by base of pronotum, depending on amount of contraction of body.

Elytra long, not truncate; humeri indicated by a slight angulation. Wings well developed, consisting of a slender sclerotized scape and a long narrow membrane with long marginal hairs that are distributed as in figure 97. The anterior distal end of the scape lacks the prominent bristle that is so characteristic of the wings of numerous genera in the *Pteryx–Ptinella* and the *Acrotrichis* groups.

Mentum with lateral expansions at middle.

Prosternum (fig. 95, *b*) short anterior to the coxae; approximately one half the least diameter of the coxal acetabulum.

Mesosternal carina in form of arrowhead (fig. 95, *b*), the apex directed posteriorly between the mesocoxae (overlying their medial portions) and uniting with the metasternum without indication of a suture. Mesocoxal acetabula broadly contiguous internally. The mesopleural-metasternal suture directed laterally, thence curving anteriorly, marked internally near the mesocoxae by an endoskeletal fold. Metasternum nearly twice as broad as long, produced between the nearly contiguous metacoxae into an acute bifurcate process; disk with the characteristic "metasternal lines" of the Nanosellinae. The metasternal lines originate at the postero-lateral edge of the mesocoxae and proceed to the metasternal process

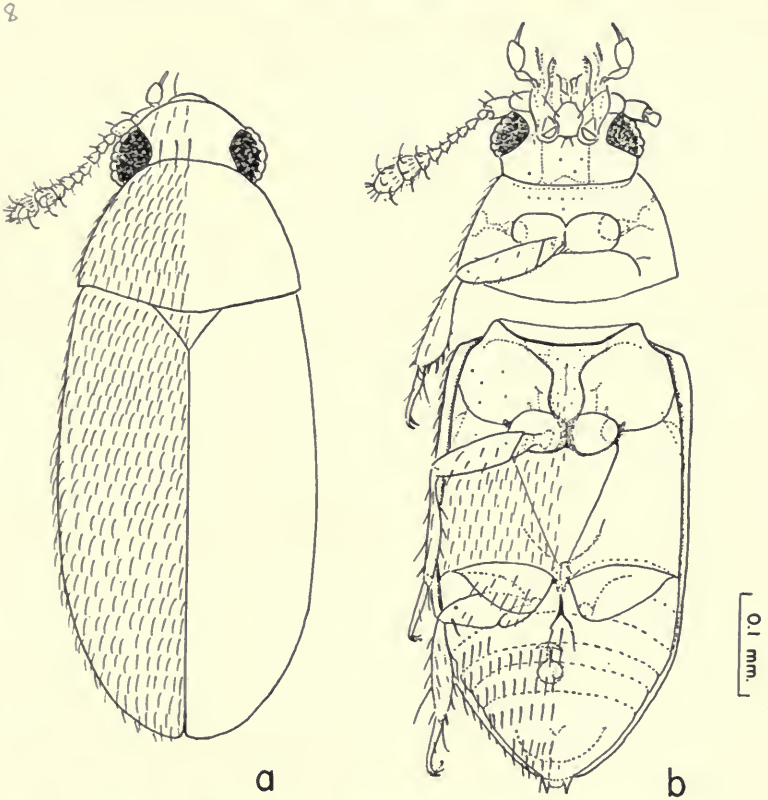

FIG. 95. *Porophila malkini* gen. and sp. nov. *a*, Dorsal view. *b*, Ventral view, female; composite drawing.

between the metacoxae, becoming more faint posteriorly. Metendosternite consisting of a short stalk with a ventral keel and two slender, divergent, dorsally ascending arms.

Abdomen covered by the elytra; 10-segmented; tergites I–VI membranous or lightly sclerotized, with a spiracle on each side. Tergite VII with posterior margin micro-pectinate and with a pore on each side (in the position of the spiracles on preceding segments and perhaps representing a vestigial spiracle). Tergites III–VII (VIII?) with a paratergite on each side. Tergite IX with anterior margin prolonged internally on each side into a long apodeme. Terminal tergite (X) with a broad terminal spine ("pygidial spine"="anal spine," Barber, 1924) in the form of a lobe with an acute tooth on each side. Sternite III (first visible ventral segment) with a median carina between the metacoxae. Sternites III–VII (and sternite VIII less markedly) with their anterior internal margins thickened (antecostae). On cleared microscope slide preparations the segmentation of the abdomen is indicated by these thickenings rather than by the posterior margins of the sternites, which are very thin and scarcely detectable. In the female, sternite IX is an arcuate

sclerite with two small setae at middle and is normally concealed by VIII. In the male, sternite IX is a small sclerite nearly completely concealed by VIII, with a long, median, internal prolongation anteriorly.

Legs moderately short (figs. 95, *b*, 96, *b–d*); posterior coxae very broadly laminate, covering much of the femur in repose. Tarsi slender; tarsal claws subequal, with a clubbed seta between.

Spermatheca (fig. 96, *e*, *f*) small, with a thick-walled bulbous enlargement at the attachment of the spermathecal "pump."

Aedeagus (fig. 96, *g*, *h*) an asymmetrical tube, the apical portion apparently distinct.

Remarks.—Porophila appears to be a generalized member of the Nanosellinae. It is a large and broad form. *Mycophagus* (cf. *atrocephalus* Dury) is clearly more specialized in such features as the reduced segmentation of the antennae, the unequal tarsal claws, and the more slender body form. In addition to the type species, *Porophila malkini* sp. nov., I have seen a related undescribed species from Mexico.

The "metasternal lines" ("metasternal carinae" and "postmesocoxal carinae" of Barber, 1924) appear as fine striae when examined dry at 352X with an incident light illuminator (Leitz Ultropak). The metasternal lines are diagnostic characters of the Nanosellinae. The differences in the length of the lines reported by Barber can probably be attributed to different degrees of clearing of his microscope slide preparations.

The seventh dorsal segment of the abdomen has the posterior margin minutely and regularly incised to form a comb-like fringe in virtually all of the Ptiliidae that I have examined. In the present paper, I am describing this tergal border as "micro-pectinate" (noun: micro-pecten) instead of "microscopically comb-like" (Dybas, 1955). The structure is a useful landmark on the dorsum of the abdomen and helps considerably in interpreting the condition of the spiracles, paratergites, and other structures of the adjacent segments. It is particularly useful in determining the condition of the pygidium, which may be composed of tergum X only, as in *Porophila*, or of IX and X fused, as in the *Acrotrichis* group of genera. These features of the abdomen promise to be useful in the classification of the higher categories in the family.

Like many other structures of the dorsum of the abdomen, the micro-pecten of tergum VII may have some function associated with wing folding and the arrangement of the long marginal hairs of the wing. In a species of *Ptinella* from Indiana, the micro-pecten is present in individuals of the "normal form" (with well-developed

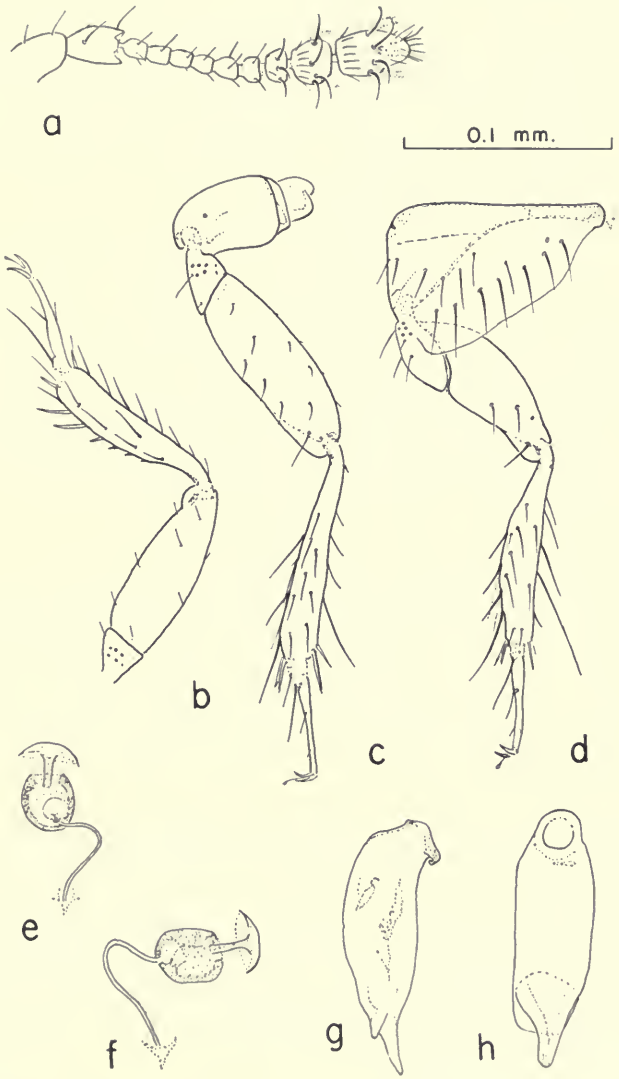

FIG. 96. *Porophila malkini* gen. and sp. nov. *a*, Left antenna, ventral view. *b*, Anterior left leg, posterior face. *c*, Middle left leg, anterior face. *d*, Posterior left leg, anterior face. *e*, *f*, Two different views of spermatheca. *g*, Aedeagus, ventral view. *h*, Aedeagus, lateral view.

wings, eyes, and body pigmentation) but is lacking in individuals of the "vestigial form" (with greatly reduced wings, eyes, and pigmentation of the body). It is also lacking in an undescribed genus of blind and wingless Ptiliidae from a South African cave. These correlations suggest a functional relationship between the wings and the micro-pecten and a positive selection for the micro-pecten when functional wings are present. In any case, the micro-pecten is a fundamental character of the Ptiliidae.

In *Porophila*, as in Ptiliidae in general, the posterior arms of the tentorium insert on the posterior margin of the head capsule. The gula is thus completely lacking in *Porophila* and in all other Ptiliidae known to me. The insertion of the posterior arms of the tentorium on the posterior margin of the head capsule and the associated absence of the gula are fundamental features of the Ptiliidae and of the closely related family of myrmecophiles, the Limulodidae (Seevers and Dybas, 1943, pp. 549–552), and were presumably present in the common ancestry of these two families.

Porophila malkini sp. nov. Figures 95–97.

Color yellow-brown; eyes black; the appressed marginal hairs of the folded wing visible through each elytron as blackish vittae; dorsal surface clothed with pale, inclined setae which are longer toward apex of elytra than on pronotum.

Head with 3–4 irregular transverse rows of sparse setae that become longer posteriorly; the posterior row (at level of middle of eyes) with about 5 long setae that are three or more times the length of the discal pronotal setae. Antennae short, somewhat longer than length of pronotum; form and chaetotaxy as in figure 96, *a*; setae very pale.

Mesosternal carina (fig. 95, *b*) with a short, longitudinal, feeble carinule at middle; apex with a few small, scattered setae. Metasternum moderately clothed with short, slender setae.

Legs with form and chaetotaxy as in figure 96, *b–d;* all setae pale in color.

Sternites IV–VII each with a subapical row of long setae; sternite III (first visible ventral segment) with about 5–7 setae on each side and 3–4 in the middle, posterior to the carina; sternite VIII with two irregular subapical rows of larger (especially laterally), much more closely placed setae.

Spermatheca as in figure 96, *e, f.*

Aedeagus as in figure 96, *g, h.*

Measurements: Length 0.66 mm. (in extended specimens in alcohol); width 0.26 mm.

Holotype.—A female, mounted on a microscope slide, from Coos Bay, Coos County, Oregon; collected July 10, 1951, by Borys Malkin. In the collection of Chicago Natural History Museum. Host fungus: *Fomes pinicola* (Fr.) Cke., identified by J. Stevenson

(host fungus deposited in collection of Chicago Natural History Museum).

Allotype.—A male, same data as the type.

Paratypes.—A total of 171 specimens (not including numerous fragmentary specimens): 25 specimens, same data as the holotype;

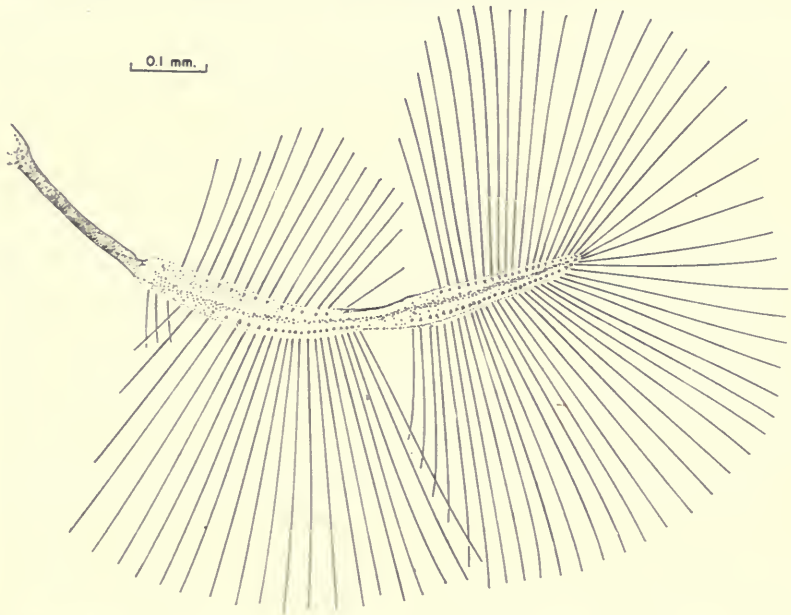

FIG. 97. *Porophila malkini* gen. and sp. nov. Left wing, ventral view.

65 specimens from Glenada, Lane County, Oregon, collected June 11, 1951, by Borys Malkin (host fungus: *Fomes pinicola* (Fr.) Cke., identified by J. Stevenson; host fungus deposited in Chicago Natural History Museum); 81 specimens from Glenada, Lane County, Oregon, collected July 11, 1951, by Borys Malkin (no host data). Paratypes deposited in the Hatch Collection of Coleoptera at the University of Washington and in Chicago Natural History Museum.

Remarks.—In several of the slide preparations, there are numerous thin-walled, oval or circular fungus spores, about 0.004 mm. in diameter, in the guts of the beetles. This evidence tends to confirm Barber's statement that both adults and larvae feed on the growing spores of the host fungus.

The capture of two of the type lots of *Porophila malkini* from the same species of fungus in two separate localities in Oregon, suggests

host-specificity of the beetle to *Fomes pinicola* (Fr.) Cke. Further records are needed to confirm this suggestion. Barber recorded the same species of fungus as the host of the type series of *Cylindrosella dampfi* Barber, from Mexico.

I feel that it is particularly appropriate to name this new species for my friend Borys Malkin, who has collected not only this species but also many other new Nanosellinae in his travels in the United States and Central America, in the Indo-Australian region, and in Africa.

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